

What is claimed is:

1. A disk drive comprising:

a storage disk having a plurality of tracks;

a data transducer;

an actuator assembly that supports the data transducer over one of the tracks, the actuator assembly having a rotatable actuator hub and a longitudinal axis, the actuator hub being subjected to a resultant force that can cause track misregistration of the data transducer during movement of the actuator assembly; and

a positioner that moves the actuator assembly relative to the storage disk, the positioner including (i) a magnet assembly that generates a magnetic field, and (ii) a first conductor region that cooperates with the magnet assembly to generate a first force that is directed at an angle having an absolute value that is greater than zero degrees and less than approximately 45 degrees relative to the longitudinal axis of the actuator assembly to at least partially offset the resultant force at the actuator hub.

2. The disk drive of claim 1 wherein the positioner includes a second conductor region that cooperates with the magnet assembly to generate a second force that is directed at an angle having an absolute value that is greater than zero degrees and less than approximately 45 degrees relative to the longitudinal axis of the actuator assembly.

3. The disk drive of claim 2 wherein the sum of the first force and the second force is substantially equal to and directionally opposite the resultant force.

4. The disk drive of claim 2 wherein the first conductor region and the second conductor region are positioned symmetrically on opposite sides of the longitudinal axis of the actuator assembly.

5. The disk drive of claim 2 wherein the magnet assembly includes a first
2 magnet and a second magnet, and wherein the first and second conductor regions
are positioned directly between the first and second magnets.

6. The disk drive of claim 5 wherein the first magnet includes a first facing
2 surface and a pair of outer regions, each outer region having a north pole on the first
facing surface, connected by an inner region having a south pole on the first facing
4 surface, and wherein the second magnet includes a second facing surface and a pair
of outer regions, each outer region having a south pole on the second facing surface,
6 connected by an inner region having a north pole on the second facing surface.

7. The disk drive of claim 6 wherein at least one of the outer regions has a
2 magnet width that is greater than a magnet width of the inner regions.

8. The disk drive of claim 2 wherein the first conductor region and the
2 second conductor region are included in a single coil.

9. The disk drive of claim 2 wherein the conductor assembly includes (i) a
2 first coil that includes the first conductor region, and (ii) a spaced apart second coil
that includes the second conductor region.

10. The disk drive of claim 9 wherein the first coil and the second coil are
2 substantially symmetrical relative to the longitudinal axis of the actuator assembly.

11. The disk drive of claim 9 wherein the magnet assembly includes a first
2 magnet and a second magnet, and wherein the first and second conductor regions
are positioned directly between the first and second magnets.

12. The disk drive of claim 2 wherein the first conductor region and the
2 second conductor region are positioned at an angle having an absolute value that is
greater than approximately 60 degrees and less than 89 degrees relative to the
4 longitudinal axis of the actuator assembly.

13. The disk drive of claim 2 wherein the first conductor region and the
2 second conductor region are positioned at an angle having an absolute value that is
greater than approximately 70 degrees and less than 85 degrees relative to the
4 longitudinal axis of the actuator assembly.

14. The disk drive of claim 2 wherein the first force is directed at an angle
2 having an absolute value that is greater than one degree and less than
approximately 30 degrees relative to the longitudinal axis of the actuator assembly,
4 and the second force is directed at an angle having an absolute value that is greater
than one degree and less than approximately 30 degrees relative to the longitudinal
6 axis of the actuator assembly.

15. The disk drive of claim 2 further comprising a control system that
2 independently directs current to each of the conductor regions.

16. A disk drive comprising:

2 a storage disk having a plurality of tracks;

a data transducer;

4 an actuator assembly that supports the data transducer over one of the
tracks, the actuator assembly having a rotatable actuator hub and a
6 longitudinal axis, the actuator hub being subjected to a resultant force that can
cause track misregistration of the data transducer during movement of the
8 actuator assembly; and

a positioner coupled to the actuator assembly, the positioner moving
10 the actuator assembly relative to the storage disk, the positioner including (i) a
magnet assembly that generates a magnetic field, and (ii) a conductor
12 assembly having a first conductor region that is positioned at an angle having
an absolute value of greater than approximately 45 degrees and less than 90
14 degrees relative to the longitudinal axis of the actuator assembly, the first
conductor region interacting with the magnetic field to at least partially offset
16 the resultant force at the actuator hub.

17. The disk drive of claim 16 wherein the conductor assembly includes a
2 second conductor region that is positioned at an angle having an absolute value of
greater than approximately 45 degrees and less than 90 degrees relative to the
4 longitudinal axis of the actuator assembly, the second conductor assembly
interacting with the magnetic field to at least partially offset the resultant force at the
6 actuator hub.

18. The disk drive of claim 17 wherein the first conductor region and the
2 second conductor region are positioned symmetrically on opposite sides of the
longitudinal axis of the actuator assembly.

19. The disk drive of claim 17 wherein the magnet assembly includes a first
2 magnet and a second magnet, and wherein the first and second conductor regions
are positioned directly between the first and second magnets.

20. The disk drive of claim 19 wherein the first magnet includes a first
2 facing surface and a pair of outer regions, each outer region having a north pole on
the first facing surface, connected by an inner region having a south pole on the first
4 facing surface, and wherein the second magnet includes a second facing surface
and a pair of outer regions, each outer region having a south pole on the second
6 facing surface, connected by an inner region having a north pole on the second
facing surface.

21. The disk drive of claim 20 wherein at least one of the outer regions has
2 a magnet width that is greater than a magnet width of the inner regions.

22. The disk drive of claim 17 wherein the first conductor region and the
2 second conductor region are positioned within a single coil.

23. The disk drive of claim 17 wherein the conductor assembly includes (i)
2 a first coil that includes the first conductor region, and (ii) a spaced apart second coil
that includes the second conductor region.

24. The disk drive of claim 23 wherein the first coil and the second coil are
2 substantially symmetrical relative to the longitudinal axis of the actuator assembly.

25. The disk drive of claim 23 wherein the magnet assembly includes a first
2 magnet and a second magnet, and wherein the first and second conductor regions
are positioned directly between the first and second magnets.

26. The disk drive of claim 17 wherein the first conductor region and the
2 second conductor region are positioned at an angle having an absolute value that is
greater than approximately 60 degrees and less than 89 degrees relative to the
4 longitudinal axis of the actuator assembly.

27. The disk drive of claim 17 wherein the first conductor region and the
2 second conductor region are positioned at an angle having an absolute value that is
greater than approximately 70 degrees and less than 85 degrees relative to the
4 longitudinal axis of the actuator assembly.

28. The disk drive of claim 17 wherein the first conductor region cooperates
2 with the magnet assembly to generate a first force that is directed at an angle having
an absolute value that is greater than zero degrees and less than approximately 45
4 degrees relative to the longitudinal axis of the actuator assembly, and the second
conductor region cooperates with the magnet assembly to generate a second force
6 that is directed at an angle having an absolute value that is greater than zero
degrees and less than approximately 45 degrees relative to the longitudinal axis of
8 the actuator assembly, the first and second forces at least partially offsetting the
resultant force at the actuator hub.

29. The disk drive of claim 28 wherein the sum of the first force and the
2 second force is substantially equal to and directionally opposite the resultant force.

30. The disk drive of claim 17 wherein the first conductor region
2 cooperates with the magnet assembly to generate a first force that is directed at an

angle having an absolute value that is greater than one degree and less than
4 approximately 30 degrees relative to the longitudinal axis of the actuator assembly,
and the second conductor region cooperates with the magnet assembly to generate
6 a second force that is directed at an angle having an absolute value that is greater
than one degree and less than approximately 30 degrees relative to the longitudinal
8 axis of the actuator assembly, the first and second forces at least partially offsetting
the resultant force at the actuator hub.

31. The disk drive of claim 17 further comprising a control system that
2 independently directs current to each of the conductor regions.

32. A disk drive comprising:

2 a storage disk having a plurality of tracks;

a data transducer;

4 an actuator assembly that supports the data transducer over one of the
tracks, the actuator assembly having a rotatable actuator hub and a
6 longitudinal axis, the actuator hub being subjected to a resultant force that can
cause track misregistration of the data transducer during movement of the
8 actuator assembly; and

a positioner coupled to the actuator assembly, the positioner moving
10 the actuator assembly relative to the storage disk, the positioner including (i) a
conductor assembly having a first conductor region, and (ii) a magnet
12 assembly that generates a magnetic field, the first conductor region interacting
with the magnetic field to at least partially offset the resultant force at the
14 actuator hub.

33. The positioner of claim 32 wherein the conductor assembly includes a
2 second conductor region that interacts with the magnetic field to at least partially
offset the resultant force at the actuator hub.

34. The disk drive of claim 33 wherein the interaction of the first conductor
2 region with the magnetic field generates a first force, and the interaction of the

second conductor region with the magnetic field generates a second force, and
4 wherein the sum of the first force and the second force is substantially equal to and
directionally opposite the resultant force.

35. The disk drive of claim 33 wherein the magnet assembly includes a first
2 magnet and a second magnet, and wherein the first and second conductor regions
are positioned directly between the first and second magnets.

36. The disk drive of claim 33 wherein the first and second conductor
2 regions are included in a single coil.

37. The disk drive of claim 33 wherein the conductor assembly includes (i)
2 a first coil that includes the first conductor region, and (ii) a second coil that includes
the second conductor region.

38. The disk drive of claim 37 wherein the magnet assembly includes a first
2 magnet and a second magnet, and wherein the first and second conductor regions
are positioned directly between the first and second magnets.

39. The disk drive of claim 38 wherein the first magnet includes a first
2 facing surface and a pair of outer regions, each outer region having a north pole on
the first facing surface, connected by an inner region having a south pole on the first
4 facing surface, and wherein the second magnet includes a second facing surface
and a pair of outer regions, each outer region having a south pole on the second
6 facing surface, connected by an inner region having a north pole on the second
facing surface.

40. The disk drive of claim 39 wherein at least one of the outer regions has
2 a magnet width that is greater than a magnet width of the inner regions.

41. The disk drive of claim 33 wherein the first conductor region and the
2 second conductor region are each positioned at an angle from the longitudinal axis

that has an absolute value of less than 90 degrees and greater than approximately
4 45 degrees.

42. The disk drive of claim 33 wherein the first conductor region cooperates
2 with the magnet assembly to generate a first force that is directed at an angle having
an absolute value that is greater than zero degrees and less than approximately 45
4 degrees relative to the longitudinal axis of the actuator assembly, and the second
conductor region cooperates with the magnet assembly to generate a second force
6 that is directed at an angle having an absolute value that is greater than zero
degrees and less than approximately 45 degrees relative to the longitudinal axis of
8 the actuator assembly, the first and second forces at least partially offsetting the
resultant force at the actuator hub.

43. The disk drive of claim 33 further comprising a control system that
2 independently directs current to each of the conductor regions.

44. A method for positioning a data transducer in a disk drive, the method
2 comprising the steps of:
supporting the data transducer with an actuator assembly having a
4 longitudinal axis; and
positioning the actuator assembly utilizing a positioner that includes (i)
6 a magnet assembly that generates a magnetic field, and (ii) a first conductor
region that cooperates with the magnet assembly to generate a first force that
8 is directed at an angle having an absolute value that is greater than zero
degrees and less than approximately 45 degrees relative to the longitudinal
10 axis of the actuator assembly.

45. The method of claim 44 wherein the step of positioning the actuator
2 assembly includes utilizing a positioner that includes a second conductor region that
cooperates with the magnet assembly to generate a second force that is directed at
4 an angle having an absolute value that is greater than zero degrees and less than
approximately 45 degrees relative to the longitudinal axis of the actuator assembly.

46. The method of claim 45 wherein the step of positioning the actuator
assembly includes the step of positioning the first conductor region and the second
conductor region each at an angle having an absolute value of greater than
approximately 45 degrees and less than 90 degrees relative to the longitudinal axis
of the actuator assembly.

47. A method for positioning a data transducer in a disk drive, the method
comprising the steps of:
supporting the data transducer with an actuator assembly having a
longitudinal axis; and
positioning the actuator assembly utilizing a positioner that includes (i)
a magnet assembly that generates a magnetic field, and (ii) a first conductor
region that is positioned at an angle having an absolute value of greater than
approximately 45 degrees and less than 90 degrees relative to the longitudinal
axis of the actuator assembly.

48. The method of claim 47 wherein the step of positioning the actuator
assembly includes the step of positioning a second conductor region at an angle
having an absolute value of greater than approximately 45 degrees and less than 90
degrees relative to the longitudinal axis of the actuator assembly.